2009 RESEARCH UPDATE

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Southern Research Station Headquarters, Asheville, NC • 828-257-4832; (FAX) 828-257-4840

Research Work Units: *(listed alphabetically by location by Science Area)*

Forest Ecosystem Restoration and Management

Asheville, NC • Upland Hardwood Ecology & Management • 828-667-5261 • *www.srs.fs.usda.gov/bentcreek*

Auburn, AL • Restoring and Managing Longleaf Pine Ecosystems • 334-826-8700 • *www.srs.fs.usda.gov/4111*

Monticello, AR • Southern Pine Ecology and Management • 870-367-3464 • *www.srs.fs.usda.gov/4106*

Saucier, MS • Forest Genetics and Ecosystems Biology • 228-832-2747 • *www.srs.fs.usda.gov/organization/unit/mississippi.htm#SRS-4153*

Forest Values, Uses, and Policies

Athens, GA • Integrating Human and Natural Systems • 706-559-4263 • *www.srs.fs.usda.gov/trends*

Auburn, AL • Forest Operations • 334-826-8700 • *www.srs.fs.usda.gov/forestops*

Pineville, LA • Utilization of Southern Forest Resources • 318-473-7268 • *www.srs.fs.usda.gov/4701*

Research Triangle Park, NC • Forest Economics and Policy • 919-549-4093 • *www.srs.fs.usda.gov/econ*

Threats to Forest Health

Asheville, NC • Eastern Forest Environmental Threat Assessment Center • 828-257-4854 • *www.forestthreats.org*

Athens, GA • Center for Forest Disturbance Science • 706-559-4316 • *http://srs.fs.usda.gov/disturbance*

Pineville, LA • Insects, Diseases, and Invasive Plants of Southern Forests • 318-473-7232 • *www.srs.fs.usda.gov/4501*

Forest Watershed Science

Franklin, NC • Center for Forest Watershed Research • 828-524-2128 • *www.srs.fs.usda.gov/coweeta*

Lincoln, NE • National Agroforestry Center • 402-437-5178 • *www.nac.gov*

Stoneville, MS • Center for Bottomland Hardwoods Research • 662-686-3154 • *www.srs.fs.usda.gov/cbhr*

Natural Resources Inventory and Monitoring

Knoxville, TN • Forest Inventory and Analysis • 865-862-2000 • *www.srsfia2.fs.fed.us*

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WOOD TO ENERGY

Summary

Bioenergy from woody biomass has the potential of contributing to the Nation's energy supply, where it can play a significant role in the mixture of "green," renewable energy sources used in the future. Given the South's abundance of wood sources, the biomass industry has the potential to not only provide energy, but produce jobs in small communities across the region.

The South is already producing an array of wood energy products including: wood pellets, hog fuel for process heat, and wood chips for electricity generation. New facilities are under construction to produce ethanol and bio-diesel from wood chips. With the southern United States serving as the Nation's "woodbasket," producing more than half of all forest products, the "wood to energy" industry is a new opportunity for economic utilization of forest resources in the region.

Southern Research Station (SRS) scientists work to develop the basic science that supports sustainable management and utilization of southern forest resources. A variety of SRS scientists are working to increase the knowledge and technology related to biomass energy conversion as well as calculating and estimating biomass production and costs. In addition, the Station provides industry and others with valuable information regarding the use of biomass/bioenergy industry in the South. SRS is uniquely positioned to continue providing basic and applied science to support the development of this emerging technology.


Researchers are studying 7-year-old loblolly pine plantations like this one in South Carolina to determine their viability for bioenergy production.


The biomass bundler's design makes the landscape accessible for removing biofuels from the forest floor.

SRS Biomass/Bioenergy Research

- The SRS Forest Inventory and Analysis (FIA) program, in conjunction with State partners, are using the most current inventory information to calculate estimates of biomass potentially available from several different sources for bioenergy production. For example, FIA will soon release a report looking at available biomass from logging residues, standing live residuals after harvest, mill residues, and urban wood waste in South Carolina. A unique feature of the report will provide estimates of available biomass at varying price points.
- Late last year, SRS collaborated with the Kisatchie National Forest and State and Private Forestry/ Forest Health Protection to install a biomass gasification unit at the Winn Ranger District in Louisiana. The Station will use the BioMax unit to

...creating the science and technology to sustain and enhance southern forest ecosystems and the benefits they provide.

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conduct biomass-to-bioenergy research, analyzing such things as whether electrical or liquid fuel output varies depending on the tree and section of tree burned. Surplus electricity is returned to the power grid.

- SRS worked with partners to develop the Biomass Site Assessment Tool (BioSAT), a comprehensive Web-based analytical dashboard for agricultural and forestry biomass. The Web site, www.BioSAT.net, will be available for public use in early 2009. The BioSAT system rapidly screens and sites cellulosic biomass collection or processing centers by zip-code tabulation area for the 33 Eastern States.

- SRS is working with partners to develop a state-of-the-issue report and an information management system on the current and emerging wood-to-energy industry in North America (Canada and U.S.). The project is titled "State of Wood-based Bioenergy/Biofuels Technologies and Industries in North America" and funded by U.S. Endowment for Forestry and Communities. Partners include the University of Tennessee Office of Bioenergy Programs and Forest Products Center, USDA Forest Service Southern Research Station, Biomass Energy Resource Center, Southeastern Sun Grant Center/Sun Grant Association, and others.

- Collaborating with partners, SRS is updating the POLYSYS model to include forests and short rotation woody crops. POLYSYS is a dynamic model of the U.S. agricultural sector capable of estimating annual changes in land use and crop prices. The purpose is to add a forest module to POLYSYS so that land competition issues and a full set of biofuel feedstocks can be evaluated under a set of pre-specified scenarios.

Wood chips are utilized for converting wood to energy in the BioMax

View of the forest following mechanical thinning—the biomass was removed to reduce fire hazards and for bioenergy production.

- The Station's Forest Operations unit has made its Forest Residue Trucking Simulator (version 5) available online. Private contractors, government agencies, and municipalities use the tool to compare alternative methods of moving biomass from the forest to a wood-using facility.

- SRS is partnering with the University of Florida on the "Wood to Energy" project, which aims to increase community understanding and discussion about the possibility of using wood for energy in the South. Partners are generating outreach materials for "Biomass Ambassadors" to use in communities across the region.

- SRS scientists are analyzing drying rates for wood used in bioenergy. A study examined drying rates for loblolly pine harvested at different seasons. Natural drying is a cost-effective method of increasing the net energy value of woody biomass. The study is being expanded to include controlled tests in an environmental chamber to predict drying rates under a wider range of climatic conditions.

- SRS scientists, in collaboration with Region 8 and private industry, recently tested innovative systems for harvesting understory forest biomass. This could be used as an alternative to prescribed fire. As a result of the field trials, industry partners have developed a commercial machine.

- SRS researchers are working with Renewable Oil International, Auburn University, and Ft. Bragg to test a fast pyrolysis system that will convert woody biomass into bio-oil. The study includes analysis of feedstock availability, costs of production, impacts, and utilization of the bio-oil.

- With funding from a USDA Forest Service biomass grant, the Station's Forest Operations unit tested new equipment to produce size-specific woody biomass feedstock for co-milling trials at Alabama Power's Gadsden, AL, power plant. This study included a variety of partners including the National Forests in Alabama, the Cawaco Resource Conservation & Development Council, Southern Company, Precision Husky Corporation, University of Alabama, and Reynolds Wood Products.

- Working with John Deere and Auburn University, the Station's Forest Operations unit is modifying a biomass bundler. The objective is to test methods of reducing the costs of biomass collection and transport. (AL, FL)

Using the biomass bundler to secure the biomass material for removal from the forest.

- SRS scientists are helping to define a national strategy for biomass research and development by partnering on interagency working groups with DOE. The National Biofuels Action Plan and Working Group Reports will be the framework for coordinated Federal action.

- The Southern Forest Futures Project is projecting implications of several possible futures on the condition of the South's forests. The impacts of developing bioenergy markets in the South are being investigated including effects on landowners, timber markets, economic returns, and resource condition.

- SRS has developed a joint research facility with Auburn University and the Center for Bioenergy and Bioproducts. University researchers in the Forest Service laboratory are studying gasification processes and feedstock preparation and conversion.

- Scientists from the Southern and Northern Research Stations are examining new hardwood forest management treatments on the Daniel Boone National Forest in Kentucky. The treatments will help improve forest health by removing biomass that will be used for energy production along with traditional forest products.

About the Southern Research Station

SRS is part of the Nation's largest forestry research organization – USDA Forest Service Research and Development – the leading organization for research on natural resource management and sustainability in the United States. Headquartered in Asheville, North Carolina, SRS serves 13 Southern States and beyond.

Since the beginning of the 20th Century, our researchers have excelled in studies on temperate and tropical forests, forest resources, and forest products. These studies provide a wealth of long-term data sets and conclusions on the dynamics of tree plantations and natural stands, watersheds, and wildlife habitats.

Today our staff of 130 scientists is organized into research work units within science areas, with science technicians and other support personnel who work at various locations through the region: at Federal laboratories, university campuses, and experimental forests.